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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/823,852	03/29/2001	Naoyasu Miyagawa	CALMP029	7011

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EXAMINER	
PATEL, GAUTAM	
ART UNIT	**PAPER NUMBER**
2655	

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/823,852	MIYAGAWA ET AL.	
	Examiner	Art Unit	
	Gautam R. Patel	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-13 and 16-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-13 and 16-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 3-13 and 16-33 are pending for the examination.

RCE STATUS

2. The request filed on 11-12-04 for Request for Continued Examination (RCE) under 37 CFR 1.114 based on parent Application is acceptable and a RCE has been established. An action on the RCE follows.

Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3-7, 11-13, 16, 25-28 and 30-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuji et al., US. patent 5,537,381 (hereafter Fuji) in view of Ganter et al., US. patent 5,802,112 (hereafter Ganter).

As to claim 3, Fuji discloses the invention as claimed [see Figs. 1-31, especially 11-15] including mapping the data to a set of write symbols, defining a set of variable write parameters, generating a plurality of candidate write symbols, generating a plurality of readout waveforms, analyzing the readout waveforms, selecting selected ones of the plurality of candidate write symbols and writing the data to the medium, comprising the steps of:

mapping the data to a set of write symbols [fig. 14, set of "0" and "1"] wherein each write symbol represents a possible N-bit segment [three zeros than one etc.] of the data and wherein the set of write symbols is defined by [col. 14, line 41 to col. 15, line 29 and fig. 13]:

defining a set of variable write parameters [col. 14, line 50 to col. 15, line 29 and fig. 13];

generating a plurality of candidate write symbols [fig. 12] that specify different values for the variable write parameters [col. 13, line 50 to col. 14, line 15];

generating a plurality of readout waveforms [fig. 14 & 15] produced by the plurality of candidate write symbols [col. 14, line 41 to col. 15, line 29];

analyzing the readout waveforms to determine a set of distinguishable readout waveforms [col. 14, line 41 to col. 15, line 29]; and

selecting selected ones of the plurality of candidate write symbols that correspond to the distinguishable readout waveforms to be included in the set of write symbols [col. 14, line 41 to col. 15, line 29]; and

writing the data to the medium using the set of write symbols [col. 14, line 41 to col. 15, line 29].

Fuji discloses all of the above elements, including recording data on a medium with different patterns and distinct write symbols of N-bit segments. Fuji does not specifically discloses that the data is divided into N-bit segments or that write symbols and generating analog readout waveforms or specifically that readout waveforms are of analog to the extent claimed.

However, production of analog waveforms from the recording medium and dividing the data into segments has been well known in the art for a long time. Also Ganter clearly discloses:

that it is well known in the art to divide the data into data segments of N-bits wherein N represents an integer greater than one and store these write symbols [symbol waveforms] into the table [col. 14, lines 25-54].

Both Fuji and Ganter are interested in generating and encoding write symbols. Both are interested in improving managing the data for most efficient transmission and storage.

One of ordinary skill in the art at the time of invention would have realized that reduction of complex calculation and high encoding efficiency would be a good characteristics to have while managing data in the system of Fuji.

Therefore, it would have been obvious to have used a division of data into N-bit segments and generating analog readout waveforms in the system of Fuji as taught by Ganter because one would be motivated to avoid complex calculation while managing data and provide a technique for encoding data with a high efficiency [col. 1, lines 41-48 and lines 65-67; Ganter].

4. The aforementioned claim 4, recites the following steps, inter alia, disclosed in Fuji: the medium is an optical disc [col. 23, lines 11-20].

5. The aforementioned claim 5, recites the following steps, inter alia, disclosed in Fuji: the medium is a phase change optical disc [col. 23, lines 11-20].

6. The aforementioned claim 6, recites the following steps, inter alia, disclosed in Fuji: the set of variable write parameters defines characteristics of a sequence of laser pulses [col. 14, lines 1-12 and fig. 11].

7. The aforementioned claim 7, recites the following steps, inter alia, disclosed in Fuji: the set of variable write parameters defines the timing of a sequence of laser pulses [col. 13, lines 49-56].

8. The aforementioned claim 11, recites the following steps, inter alia, disclosed in Fuji: a matched filter is used to recover the data [fig. 10, unit 49] [col. 13, lines 50-67]. NOTE: see also fig. 1.

9. The aforementioned claim 12, recites the following steps, inter alia, disclosed in Fuji: a cross correlation coefficient is calculated to recover the data [col. 13, lines 50-67]. NOTE: see also fig. 1.

10. The aforementioned claim 13, recites the following steps, inter alia, disclosed in Fuji: a combination of a cross correlation coefficient and comparison of a DC level is used to recover the data [col. 19, lines 1-9].

11. As to claim 16, it is rejected for the same reasons set forth in the rejection of claim 3, supra.

12. As to claims 25-28, they are claims corresponding to claims 4-7 respectively and they are therefore rejected for the same reasons set forth in the rejection of claims 4-7 respectively, supra.

13. The aforementioned claim 30, recites the following steps, inter alia, disclosed in Ganter:

Comparing analog readout waveforms obtained from individual segments to waveforms in pre-stored tables [previously stored] using predetermined pattern recognition techniques [col. 14, lines 25-54].

14. The aforementioned claim 31, recites the following steps, inter alia, disclosed in Ganter:

Sampling a readout waveform signal;

Normalizing an amplitude of the signal;

Separating the signal into segments [col. 14, lines 25-54].

15. The aforementioned claim 32, recites the following steps, inter alia, disclosed in Ganter:

Calculating a cross-correlation coefficient between the segments and patterns in look-up table [col. 14, lines 25-54];

As to rest of the claim Fuji discloses:

Comparing DC level of the segments with patterns in the look-up table [col. 19, lines 1-9]; and figs. 14 and 21].

16. The aforementioned claim 33, recites the following steps, inter alia, disclosed in Fuji:

The variable write parameters comprise one or more of a height of a laser pulse, a duration of a laser pulse, a width of a cooling pulse following a heating pulse, an interval between adjacent laser pulses, and a power level of a laser pulse [col. 13, line 56 to col. 14, line 21 and fig. 12].

17. Claims 8-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuji and Ganter as applied to claim 3-7 above and further in view of Pettigrew et al., US. patent 4,703,469 (hereafter Pettigrew).

Fuji and Ganter discloses all of the above elements, including write symbols generation and avoiding the thermal crosstalk and inter-symbol interference by detecting "delta v" [see col. 9, lines 14-67]. Fuji does not specifically discloses that the same goal of reducing thermal crosstalk and inter-symbol interference can also be achieved by well-known method of inserting guard bands.

However, it is well known in the art that all recording inherently have to have guard bands to avoid crosstalk between tracks or between any data such as write symbols. Without guard bands data cannot be read properly and system will not function at all. And by using guard bands of appropriate size crosstalk between adjacent data [write symbols] can be reduced or avoided. Also Pettigrew clearly discloses that it is well known in the art:

writing the data to the medium includes inserting guard bands between the write symbols [ABSTRACT, and col. 1, lines 11-34 and col. 4, line 61 to col. 5, line 19 and fig. 1].

Both Fuji, Ganter and Pettigrew are interested in improving the read/write mechanism of an optical disk. Both Fuji Ganter and Pettigrew show system to reduce crosstalk and thermal interference, both create write symbols for optical disks.

One of ordinary skill in the art at the time of invention would have realized that the crosstalk and inter-symbol interference is present on all the disks at all data levels that are recorded and reduction of these kind of noises is a good and necessary characteristic to have. Therefore, it would have been obvious to have used guard band mechanism in the system of Fuji and Ganter as taught by Pettigrew because one would be motivated to reduce noise and cross-talk or intersymbol interference in the system of Fuji and Ganter and provide better signal controls with help of well known guard bands and improve quality of the write symbol signals [col. 1, lines 11-29; Pettigrew].

NOTE: Pettigrew discloses guard bands between tracks, but since different write symbols can be and are generally recorded on different tracks also. The same guard bands or concept of the guard bands are also equally applicable to guard bands between write symbols.

18. The aforementioned claim 9, recites the following steps, inter alia, disclosed in Pettigrew:

writing the data to the medium includes inserting guard bands between the write symbols wherein the guard bands are appropriately sized to avoid intersymbol interference [ABSTRACT, and col. 1, lines 11-34 and col. 4, line 61 to col. 5, line 19 and fig. 1].

19. The aforementioned claim 10, recites the following steps, inter alia, disclosed in Pettigrew:

writing the data to the medium includes inserting guard bands between the write symbols wherein the guard bands are appropriately sized to avoid thermal crosstalk [ABSTRACT, and col. 1, lines 11-34 and col. 2,, lines 13-63].

20. Claims 17-20 and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuji and Ganter as applied to claims 3-7 and 16 above, and further in view of McNeil et al., US. patent 5,995,305 (hereafter McNeil).

As to claim 17, Fuji and Ganter discloses all of the above elements, including write symbols that specify different values for the variable write parameters. Fuji does not specifically discloses what kind of algorithm is being used for generation of the write symbols.

However, it is well known in the art that all recording patterns inherently have to be generated by some kind of algorithm, specific and/or generic. Also McNeil clearly discloses:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using a genetic algorithm to generate the plurality of candidate write symbols [col. 6, lines 26-53].

All Fuji, Ganter and McNeil are interested in improving the read/write mechanism of an optical disk. Both Fuji and McNeil discloses write pattern generation by controlling laser current and power.

One of ordinary skill in the art at the time of invention would have realized that all kind noise and disturbance needs to be control in all kind of environment including off-track noise. Ability to control off-track noise is a good characteristic to have in a system and appropriate algorithm needs to be applied for this ability.

Therefore, it would have been obvious to have used an optimization algorithm [generic algorithm] in the system of Fuji and Ganter as taught by McNeil because one would be motivated to reduce noise and cross-talk or intersymbol interference under all conditions in the system of Fuji and Ganter and provide better signal controls with help of well known bands and improve quality of the signals [col. 5, lines 38-52; McNeil].

21. The aforementioned claim 18, recites the following steps, inter alia, disclosed in McNeil:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes randomly generating the plurality of candidate write symbols [col. 7, lines 48-67].

22. The aforementioned claim 19, recites the following steps, inter alia, disclosed in McNeil:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate the plurality of candidate write symbols [col. 9, lines 15-67].

23. The aforementioned claim 20, recites the following steps, inter alia, disclosed in McNeil:

a plurality of candidate write symbols that specify different values for the variable write parameters includes using expert knowledge to generate an initial set of candidate write symbols and using a genetic algorithm to refine the initial set of candidate write symbols [col. 9, lines 15-67]. [col. 9, lines 15-67].

24. The aforementioned claim 24, recites the following steps, inter alia, disclosed in McNeil:

analyzing the readout waveforms produced by the marks to determine a set of readout waveforms that match a read/write channel that includes the recording medium includes determining ideal readout waveforms follow the read/write channel SNR spectrum [col. 5, lines 13-37 and TABLE 1].

25. Claims 21-23 and 29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fuji, and Ganter as applied to claims 16, above, and further in view of Kobayashi et al., US. patent 5,978,333 (hereafter Kobayashi).

As to claim 21, Fuji and Ganter discloses all of the above elements, including write symbols that specify different values for the variable write parameters. Fuji does not specifically discloses that this procedure includes selecting a pair of waveforms to represent individual channel bits and also manipulating these bits to produce desired results.

However, complimentary waveforms [mirror image of each other] are well known in the art for recording patterns on an optical disk. Also Kobayashi clearly discloses:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair waveforms to represent individual channel bits [col. 3, line 60 to col. 4, line 12].

All Fuji Ganter and Kobayashi are interested in improving the read/write mechanism of an optical disk. Both Fuji and Kobayashi discloses write pattern generation by controlling laser current and power under different condition including wobble pattern.

One of ordinary skill in the art at the time of invention would have realized that intensity of the reflection is not constant in mark position and guard-band or gap, and therefore it is difficult to achieve exact reproduction. Ability to achieve exact reproduction is a desired characteristic to have in a system. Therefore, it would have been obvious to have used an a pair waveforms to represent individual channel bits in the system of Fuji and Ganter as taught by Kobayashi because one would be motivated to achieve exact reproduction in the system of Fuji and provide better signal controls [col. 1, lines 36-44; Kobayashi].

26. The aforementioned claim 22, recites the following steps, inter alia, disclosed in Kobayashi:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair waveforms to represent individual channel bits and shifting and adding combinations of the waveforms [col. 12, line 5 to col. 13, line 20].

27. The aforementioned claim 23, recites the following steps, inter alia, disclosed in Kobayashi:

generating a plurality of candidate write symbols that specify different values for the variable write parameters includes selecting a pair waveforms to represent individual channel bits [col. 3, line 60 to col. 4, line 12]. As to the rest of the claim McNeil discloses:

wherein the spectrum of the pair of waveforms becomes band-limited and closely resembling the channel's spectrum of signal-to-noise ratio, SNR(f) [col. 5, lines 13-37 and TABLE 1].

28. As to claim 29, Fuji and Ganter teaches all of the above limitations including recovering data. Fuji does not teach well-known use of viterbi detector. "Official Notice" is taken that both the concept and the advantages of providing a viterbi detector are well known and expected in the art. It would have been obvious to include a viterbi detector in the system of Fuji as this viterbi detector are known to provide better decoding for these kind of signals and thereby saving time and money on the decoding these signals These concepts are well known in the art and do not constitute a patentably distinct limitation, per se [M.P.E.P. 2144.03].

Other prior art cited

29. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Iizuka (US. Patent 5,790,715) "Method and apparatus for recording/reproducing ....".

Contact Information

30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gautam R. Patel whose telephone number is (703) 308-7940. The examiner can normally be reached on Monday through Thursday from 7:30 to 6.

The appropriate fax number for the organization (Group 2650) where this application or proceeding is assigned is (703) 872-9314.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Doris To can be reached on (703) 305-4827.

Any inquiry of a general nature or relating to the status of this application should be directed to the group receptionist whose telephone number is (703) 305-4700 or the group Customer Service section whose telephone number is (703) 306-0377.

Gautam R. Patel
Primary Examiner
Group Art Unit 2655

January 13, 2005

GAUTAM R. PATEL
PRIMARY EXAMINER